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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/558,352	11/20/2006	Stephan H. Hussman	20294/0203630-US0	6488

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EXAMINER	
AMRANY, ADI	
ART UNIT	**PAPER NUMBER**
2836	
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/558,352	HUSSMAN ET AL.	
	Examiner	Art Unit	
	ADI AMRANY	2836	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *30 December 2009*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-3,5-38 and 40-51* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-3,5-38 and 40-51* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on December 30, 2009 has been entered.

Response to Arguments

2. Applicants' arguments filed with the RCE with respect to Boys I have been considered and are persuasive. Boys I (fig 5) discloses monitoring the secondary circuit frequency (not power) and varying the effective capacitance/inductance to tune the circuit. Applicants' remarks regarding figure 6 (Remarks, top of page 15) are not persuasive. Although the dummy-trolley is not a fully operating vehicle, it still has "a load." A load is any device that uses power. The Boys I dummy trolley meets this broad definition.

Applicants' arguments regarding Rydval are not persuasive. Applicants first point to col. 1, lines 28-39 of the reference to show that only a frequency is detected. This section of the reference, however, discusses the background art ("such systems with contactless power transmission"). Rydval's column 1 is not a discussion of the preferred embodiment of the patent. Rydval discloses that the control device (11) varies the effective impedance of the pickup circuit by sensing "the voltage which can be picked off at the resonant circuit (terminal 3)" (col. 3, lines 37-41). Also, Rydval's

figure 2 (col. 3, line 64 to col. 4, line 7) shows that the control device (11) relies, in part, on the instantaneous value of the resonant circuit voltage.

Applicants' arguments regarding Boys II are persuasive. Boys II discloses a controlled reactive element (202), but does not disclose that the element can be controlled to vary its effective capacitance/inductance. As stated by the applicants, the switch connects or removes the capacitor entirely from the circuit. The capacitance is never varied.

A new set of art rejections is presented below, based on two of the three references discussed above (Boys I and Rydval) and a new reference; Boys III (US 5,293,308). As stated in applicants' specification, "[t]he pick-up can be tuned toward the track frequency as the load increases and high power transfer is required to satisfy the demand from the increased load. The load change can be simply detected by sensing the output voltage V0 because this voltage will drop if not enough power is supplied as disclosed in Boys (US 5,293,308)" (page 9, lines 14-18). Thus, applicants' admitted prior art (based on Boys III) meets the amended limitations of the independent claims directed towards sensing the power requirement of the load.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1, 28, 37 are rejected under 35 U.S.C. 102(b) as being anticipated by Boys III (US 5,293,308).

Boys III discloses an inductively coupled power transfer pick-up and method (fig 3; col. 5-6) comprising:

a pick-up resonant circuit (fig 3; col. 7-8) comprising a capacitive element (C2-C4) and an inductive element (L4) adapted to receive power from a magnetic field associated with a primary conductive path (to the left of 3105) to supply a load (vehicle; abstract), and one of the capacitive element and the inductive element comprises a controlled reactive element (capacitor, inductor);

a sensor configured to sense a power requirement of the load (col. 8, lines 51-55; col. 9, lines 20-38; col. 11, line 52 to col. 12, line 3); and

a controller (3109) configured to selectively tune or de-tune the pick-up resonant circuit in response to the sensor by varying the effective capacitance of the controlled reactive element to control the transfer of power to the pick-up resonant circuit dependent on the sensed load power requirement (col. 8, lines 51-55).

Boys III discloses that, based on load power requirements, the effective capacitance of the pick-up circuit is varied. As admitted by the applicants (specification, page 9, lines 14-18), Boys III discloses the pick-up can be tuned by detecting output voltage, which is directly related to load power requirements . It is noted that applicants' specification goes on to state that the Boys III shorting switch and diode are not required in the present application (page 12, lines 3-5). These components (or their

absence) is not indicated in the independent claims. Regarding claim 28, Boys III also discloses a power supply with a resonant convert to provide AC power to the primary conductive path (col. 5, lines 56-65; col. 7, lines 35-56). Regarding claim 37, Boys III discloses the apparatus necessary to complete the recited method steps.

5. Claims 1-3, 28 and 37-38 are rejected under 35 U.S.C. 102(b) as being anticipated by Rydval (US 5,892,300).

With respect to claims 1, 28 and 37, Rydval discloses an inductively coupled power transfer pick-up and method (fig 1; col. 3) comprising:

a pick-up resonant circuit (col. 3, lines 27-28) comprising a capacitive element (2, 5-7) and an inductive element (1) adapted to receive power from a magnetic field associated with a primary conductive path (not shown in figures) to supply a load, and one of the capacitive element and the inductive element comprising a controlled reactive device;

a sensor (input to 11; col. 3, lines 37-41) configured to sense a power requirement of the load (col. 3, line 64 to col. 4, line 7); and

a controller (11) configured to selectively tune or de-tune the pick-up in response to the sensor by varying the effective capacitance of the capacitive element of the pick-up resonant circuit to control the transfer of power to the pick-up resonant circuit dependent on the sensed load power requirement (col. 3, line 64 to col. 4, line 7.

Rydval also discloses a power supply comprising a resonant converter to provide AC to a primary conductive path of the ICPT (col. 1, lines 28-34).

With respect to claims 2 and 38, Rydval discloses the controller comprises a reactive element (5-7) and a switching device (8-10) configured to allow the reactive element to be selectively electrically connected to the pick-up resonant circuit.

With respect to claim 3, Rydval discloses the apparent capacitance of the reactive element is varied to tune or detune the pick-up resonant circuit (col. 3, lines 42-54).

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. Claims 1-3, 5-12, 16-23, 27-38 and 40-51 are rejected under 35 U.S.C. 103(a) as being unpatentable over Boys I (US 5,898,579) in view of Boys III (US 5,293,308).

With respect to claim 1, Boys I discloses an inductively coupled power transfer pick-up (fig 5-6; col. 5-7) comprising:

a pick-up resonant circuit (fig 5, all components except for 501) comprising a capacitive element (502) and an inductive element (505) adapted to receive power from a magnetic field associated with a primary conductive path (501) to supply a load (the vehicle; col. 2, lines 3-5), and one of the capacitive element and the inductive element comprises a controlled reactive element (502, 505);

a sensor (613) configured to sense a condition of the load; and

a controller (510; col. 6, lines 14-18) configured to selectively tune or de-tune the pick-up resonant circuit in response to the sensor by varying the effective capacitance of the controlled reactive element to control the transfer of power to the pick-up resonant circuit dependent on the sensed load condition (col. 2, lines 10-19col. 3, lines 19-35; col. 5, lines 49-47; col. 6, lines 24-29).

Boys I discloses that the controller (510) senses the frequency of the system and adjusts the capacitance of the pick-up resonant circuit. Boys I does not expressly disclose that the sensor senses load power requirements or that the effective capacitance of the circuit is varied dependent on the sensed load power requirements. Boys III discloses an ICPT, as discussed above, wherein the power requirements of the load are sensed (col. 8, lines 51-55; col. 9, lines 20-38; col. 11, line 53 to col. 12, line 3 and lines 23-26).

Boys I and Boys III are analogous because they are from the same field of endeavor, namely inductive power distribution systems (ICPTs). At the time of the invention by applicants, it would have been obvious to one skilled in the art to modify the frequency monitoring of Boys I with the load power monitoring of Boys III, since Boys III discloses that changing the load characteristics may cause frequency changes. Thus, load power requirements and circuit frequency are related. Since, a change in one (load power) will result in a change in other (frequency), it would be obvious to one skilled in the art to monitor either (or both) in order to tune the circuit.

With respect to claims 2-3, Boys I discloses the controlled reactive element comprises a switching device (504), wherein the controller controls the switching device

so that the apparent capacitance of the reactive element is varied to tune or detune the pick-up resonant circuit (col. 6, line 14-18).

With respect to claim 5, Boys I discloses a phase device (col. 4, line 65 to col. 5, line 5) configured to sense the phase of voltage/current in the pick-up resonant circuit; and whereby the controller actuates the switching device dependent on the sensed phase.

With respect to claim 6, Boys I discloses the recited limitations, as discussed below in the rejection of claim 17. Boys I further discloses that it is well known to design the pick-up resonant circuit with an LC resonant circuit (col. 1, lines 21-24). One skilled in the art would recognize that an inductive element can be added to the inductance already present in the pick-up coil.

With respect to claims 7-8 and 18-19, Boys discloses a frequency sensing device (510) configured to sense the frequency of the pick-up resonant circuit whereby the controller actuates the switching device dependent on the sensed frequency.

With respect to claims 9, 17 and 20, Boys I discloses the reactive element is a capacitor (item 602); the phase sensing device senses a voltage in the pick-up resonant circuit (col. 4, line 65 to col. 5, line 5); and the controller is operable to switch the switching device in a predetermined time period after a sensed voltage zero crossing (obvious). It is also noted that Boys III discloses sensing a voltage in the pick-up circuit.

it is obvious that any controller action occurs a “predetermined time” after the sensed event that triggers the time to start. Boys I also discloses opening the switch after closing it. One skilled in the art would be able to open the switch when the voltage

reaches substantially zero. One skilled in the art, through trial and error, would recognize the optimal timing for when to control the switching device.

With respect to claims 10-11 and 21, it would be obvious to one skilled in the art to select the recited times as the predetermined time, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

With respect to claim 12, Boys discloses that the inductance of the winding is parallel to the tuning capacitor. One skilled in the art would readily understand the advantages of placing an inductor in series/parallel with the capacitor by calculating the resultant filter.

With respect to claim 16, Boys discloses the controlled reactive element comprises a pick-up coil or is connected in parallel with the pick-up coil (fig 5).

With respect to claims 22-23, it is well known in the art that capacitors placed in parallel can be replaced with one equivalent capacitor, whose capacitance equals the sum of all of the original capacitors.

With respect to claim 27, Boys I discloses the capacitor comprises the tuning capacitor of the pick-up resonant circuit (612).

With respect to claim 28, Boys I and III disclose the ICPT, as discussed above in the rejection of claim 1, and both references further disclose a power supply comprising a resonant converter to provide alternating current to a primary conductive path (Boys I, item 501; Boys III; col. 5, lines 56-65; col. 7, lines 35-56).

With respect to claim 29, Boys I discloses the primary conductive path comprises one or more turns of electrically conductive material (501). See also Boys III (item 3105).

With respect to claim 30, Boys discloses the inductively coupled power transfer pick-up is for vehicles. It would be obvious that the conductive path is beneath a substantially planar surface (a road) in order to allow the vehicle to travel.

With respect to claim 31, it would be obvious to one skilled in the art that there is a greater magnetic field at one location of the primary path. It would be obvious that the magnetic field is not exactly the same everywhere. Therefore, some portions have greater magnetic fields than others. Boys I figure 6 also shows a coil (610) within the primary path. It would be obvious that the magnetic field would be greater at a point where it is purposefully generated.

With respect to claim 32, it is obvious that Boys discloses one or more lumped inductances or one or more distributed inductances, since these limitations comprise all possible configurations for inductances. The claim does not define the relative spacing required to meet the limitations of "lumped" and "distributed."

With respect to claims 33-34, Boys discloses the primary path and the pick-up resonant circuit comprise amorphous magnetic material (601, 611).

With respect to claim 35, Boys discloses the pick-up resonant circuit is battery free (see fig 5). The battery in figure 6 is part of the primary conductive path.

With respect to claim 36, it would be obvious to one skilled in the art that it would be more efficient to replace a large capacitor with a super capacitor. The

charge/discharge properties of super capacitors are well known, as is the fact that they take up less room for the same amount of capacitance.

With respect to claims 37-38 and 40-51, Boys I and Boys III disclose the apparatus necessary to complete the recited methods, as discussed above in the rejections of claims 1-3, 5 and 7-11.

8. Claims 13-15 and 24-26 is rejected under 35 U.S.C. 103(a) as being unpatentable over Boys I in view of Boys III and applicants' admitted prior art ("APA").

With respect to claims 13 and 24, Boys I discloses a single switch. It is obvious that all capacitors have two terminals (see Boys I figure 5). APA discloses that the switching device can comprise one or two switches (page 8, lines 14-21) and the change can be accomplished by one skilled in the art. Boys and APA are analogous because they are from the same field of endeavor, namely ICPTs. At the time of the invention by applicants, it would have been obvious to replace two switches with one in order to reduce the number of parts in the circuit.

With respect to claims 14-15 and 25-26, Boys discloses an embodiment using semiconductor switches with anti-parallel diode connections (fig 7). At the time of the invention by applicants, it would have been obvious to apply these switches to the single switch of figure 6 (614), since it has been held that the rearranging of parts of an invention involves only routine skill in the art. *In re Japikse*, 86 USPQ 70 (CCPA 1950).

9. Claims 24 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rydval in view of applicants' admitted prior art ("APA").

Rydval discloses a single switch. It is obvious that all capacitors have two terminals. As discussed above, APA discloses that the switching device can comprise one or two switches (page 8, lines 14-21). Rydval and APA are analogous because they are from the same field of endeavor, namely ICPTs. At the time of the invention by applicants, it would have been obvious to replace two switches with one in order to reduce the number of parts in the circuit.

Rydval further discloses the switch can be a transistor (col. 3, lines 31-32). It would have been obvious to one skilled in the art to select at least one of IGBTs, MOSFETs, and BJTs, since these are the most common types of transistors, and they are art recognized equivalents for their ability to complete a circuit connection based on a control signal.

Conclusion

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The references cited in the enclosed list disclose other known ICPT systems with switches to vary the impedance and/or load power sensing. The references cited in the art rejection should be considered in their entirety, including the portions of the specification which disclose the embodiments already known in the prior art.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to ADI AMRANY whose telephone number is (571)272-0415. The examiner can normally be reached on Mon-Thurs, from 10am-4pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jared Fureman can be reached on (571) 272-2800 x36. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

AA

1-12-10

/Stephen W Jackson/
Primary Examiner, Art Unit 2836